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Herman B ‘Dutch’ Leonard and Arnold M Howitt say that 12 to 15 years ago, Boston would not have handled the Marathon bombings as effectively as it did this April, and that internal institutional preparedness and ability to integrate effort with other agencies are far superior today.

**Boston Marathon bombing response**

One of the greatest deficiencies of large-scale, emergency response — notably revealed in the US in the response to both 9/11 in New York City and Hurricane Katrina — is the weak co-ordination of multiple first-response organisations and supporting agencies in the midst of crisis.

But more than a decade of work to prepare responders for major operations has begun to pay off. The Boston Marathon bombing and the massive effort to identify and apprehend the terrorists this April, while not as massive a crisis as either 9/11 or Katrina, stands as a notable example of effective, co-operative first-response operations, as well as political collaboration. It demonstrates that at least some jurisdictions in the US have made important progress in overcoming the difficulties of multi-institution co-ordination during large-scale operations.

The centralised planning for this event drew on a strong culture of preparing for large ‘fixed’ events (for which time and location are known well in advance) across multiple professional disciplines (police, fire, EMS, National Guard). Although it took root earlier, this culture became much sturdier in the aftermath of 9/11.

When Boston faced the challenge of preparing for a National Special Security Event — the 2004 Democratic Party’s National Convention — it formed a multi-agency, multi-jurisdictional, multi-level planning group that worked for more than a year developing security plans.

Many lessons for future collaboration were learned from this, along with an emphasis on the importance of joint planning. Boston stages many large-scale events, some annual, some unique — from a New Year’s Eve First Night celebration, the July 4 Esplanade concert and the arrival of Tall Ships, to parades honouring national championship baseball, football, basketball and hockey teams.

A strong pattern of collaborative planning for such events has become routine, reinforced by formal and informal efforts to train responders for co-ordinated action, to exercise across agencies, jurisdictions, and levels of government, and to build strong professional and personal relationships among commanders of law enforcement, firefighting, and emergency medical organisations.

While planning and preparedness had been directed by senior management, the implementation of emergency actions did not depend on centralised leadership. Significantly, during the crisis in Boston, the response exhibited major elements of self-organising collaboration by small teams rather than top-down command. This resulted from the structuring of response in common emergency operating methods through the National Incident Management System (NIMS), as well as systematic development of organisational and personal ties among the diverse responders.

Collaborative event planning, training, exercising, and deployment at many large public events that have not suffered emergencies, laid the groundwork for performance in crisis.

Footage of the explosions near the finish line shows that blast waves pushed spectators away from the impact zone, but within seconds they began to run back to render help. The high density of the crowd contributed to the large number of injuries — but it also meant that there were many people immediately available to render aid. The number of people who climbed over barricades or tore them down to allow others to enter, and provided aid with whatever means were available, shows a city and a society at its best — people spontaneously helping each other without regard to culture, ethnicity, or nationality (the bravery of responders at the scene ran contrary to training to beware of secondary attacks).

The medical response was also immediate and skilled. Trained responders at the scene, working with members of the public, placed tourniquets, held pressure, and transported survivors to medical tents and on to ambulances beyond. Then teams of doctors, nurses, and clinical staff at hospitals took over. A large number of the grievous wounds from the blast and shrapnel would, in almost any other circumstances have proved fatal, but it appears that every person who was alive when definitive medical help was applied — in most cases, within minutes of the blast — is still alive today.

That success stems from several factors. Hundreds of medically-trained personnel were at the scene of the blast, the result of detailed central planning and learning from previous Boston Marathons and other events. Boston EMS and other local government and private emergency medical services had intensively trained and exercised, including with other responders, and had frequently deployed to special events.

In an ordinary Marathon year, thousands of runners come off the course needing care for blisters, heatstroke or possible cardiac arrest, but this year the blast triggered a 12 to 15 times increase in the number of patients needing immediate medical attention. Boston’s Medical Control Centre was not overwhelmed by the surge, and numbers were the same as previous years.

The professional and personal relationships among responders were essential. The July 4 Esplanade concert has been a part of Boston for 21 years. Although it took place in the aftermath of the Sept 11 attacks, it was not a major event by any stretch of the imagination. It demonstrated that at least some jurisdictions in the US have made important progress in overcoming the difficulties of multi-institution co-ordination during large-scale operations.

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problems. While not deployed specifically to aid bomb victims, medical personnel stationed near the finish line were skilled and adaptable and could stabilise bomb survivors, who were then triaged and dispatched to medical facilities which, real-time communication indicated, had the capacity to handle their injuries.

Fortunately, the bomb blasts did not directly degrade medical personnel and equipment positioned near the Marathon finish line — by contrast with the extensive loss in the Haiti earthquake of 2010. This suggests that future event planners should ensure that crucial resources are not concentrated in a single position and thus left vulnerable to attack.

Moreover, significant changes in treatment of blast and shrapnel trauma victims, developed on battlefields in Iraq and Afghanistan, had made their way into home-front trauma response. In particular, tourniquets, proven to staunch blood loss from major injuries to extremities, were deployed in the equipment of EMS personnel at the Marathon.

**Resourcefulness**

Boston has an extremely high concentration of the nation’s leading tertiary medical facilities, each with an emergency room, trauma unit, and advanced specialty medical services. Five of these six facilities are located within two miles of the bomb blast. This permitted definitive in-hospital care for critically-injured patients in less than a half hour — saving many who otherwise might have perished.

In recent years, these medical facilities had extensively planned, practised, and trained for mass casualty events. While most preparation did not spotlight casualties from a bomb attack, Massachusetts General Hospital had recently consulted with experts from Israel about how to handle a sudden flow of blast and shrapnel survivors.

The surge of patients facing hospitals in this incident, however, was beyond their experience, planning and normal capacity. Instead of being overwhelmed, they met the surge of patients with resourcefulness, clearing space occupied by less needy patients and improvising to accommodate unprecedented demands.

Notably, in the moments of crisis, the response by medical personnel, both at the site of the blast and in the hospitals, was handled nearly completely without central direction. EMTs and physicians at the scene, following pre-established protocols and improvising as necessary, were largely self-directed in caring for the injured. Doctors and nurses with relevant skills converged on emergency rooms without having to be called.
As ambulances delivered patients to hospitals, groups of clinicians self-organised into trauma teams. In one emergency room, people who were not needed to provide direct care realised that there was a congestion problem. They organised themselves in a side room from which they could be called as their particular skills were needed.

Several emergency room ‘incident commanders’ commented that they had to give few instructions. One said: “Everybody spontaneously knew their dance moves.” Mass casualty training and drills provided a structure for action within which improvisation to meet special problems was possible.

As the surgical teams worked, commanders became co-ordinators, helping to move scarce resources where they were most needed, dealing with the big picture, while providing support to the direct care teams. Although the full story is not yet on the public record, well over a dozen law enforcement agencies from a range of municipalities and universities, as well as the state and federal governments, co-ordinated very effectively in responding to this incident. They pieced together the nature of the attack; identified the two perpetrators’ images; responded to the perpetrators’ flight and engaged in a dramatic, but chaotic shootout that killed one; and apprehended the survivor after a massive manhunt.

Considerable progress
While certainly not perfect, only a massively collaborative effort could have orchestrated the skills, databases, intelligence, technology, operational capabilities, and personnel needed to accomplish the many law enforcement tasks involved. No single agency had the operational range, manpower, or combination of technical assets and boots on the ground to manage the entire process.

In past operations, lack of co-operation and weak integration of effort have frequently hampered performance. The Marathon aftermath demonstrated that considerable progress has been made in establishing the relationships and organisational infrastructure that allow agencies to work effectively together.

On April 15, a few thousand spectators were tightly-packed at the finish line of the 117th Boston Marathon to cheer on runners who, nearly four hours after the starter’s pistol shot, had conquered the 26.2 mile course.

At 14.50 hrs, a powerful improvised explosive device detonated without warning among the onlookers, followed 12 seconds later by an even more powerful IED nearby. Both scattered nails, ball bearings and metal shards intended to kill and maim. Three people died, and more than 260 others needed hospital care, many having lost limbs or suffering horrific wounds.

Those explosions began about 100 hours of drama that riveted the attention of the nation and left the local public shaken but proud. This account describes these events as the facts seem at this still early time of writing.

Within seconds of the blasts, medical personnel and many spectators leaped to provide aid to victims at the scene. EMTs triaged and transported the severely injured to area hospitals, where surgical teams mobilised and opened operating suites for immediate care to dozens who had lost limbs or suffered life-threatening injuries.

Law enforcement officers from many local, state and federal agencies converged to secure a 12-block area around the scene, search for additional IEDs, and begin to gather evidence that might identify the perpetrators. Massachusetts Governor Deval Patrick and Boston Mayor Thomas Menino provided support to law enforcement and medical professionals, co-ordinated their own governmental domains and connected with federal agencies and prosecutors. Senior elected leaders and law enforcement officials from all levels held regular joint press conferences over the next several days to keep the public informed.

The Boston Police and other agencies also used Facebook and Twitter to provide public updates. The FBI and state and local police collected video surveillance tapes from public and commercial sources and put out an appeal for photos taken at the scene that day. For several days, law enforcement agencies scrutinised hundreds of thousands of images, eventually zeroing in on two suspects; but efforts to match their faces to government databases failed.

On Wednesday, CNN mistakenly reported that arrests had been made, the NY Post ran photos of two ‘bag men’ it incorrectly implied were the bombers, and social media erroneously speculated about specific individuals.

On Thursday, April 18, President Barack Obama joined local leaders in a national broadcast service honouring the dead and wounded, as well as the first responders who provided aid and were searching for the terrorist suspects. Meanwhile on Thursday, law enforcement leaders debated whether to release the suspects’ images to the public. Would this put them to flight or send them underground? Or would someone know and identify them? Early Thursday evening, the FBI posted photographs of the two suspected terrorists on its website, setting off 24 hours of frenzied action.

The terrorists, perhaps spooked by an email to one from a friend asking whether it was him in the photos, left their apartment in Cambridge, killed an MIT campus policeman in an unsuccessful effort to take his firearm, then hijacked a Mercedes sedan and its driver whose ATM they used to get funds for their escape.

But the driver escaped and called 911, reporting that the carjackers had claimed they were the Boston Marathon bombers. Tracking the Mercedes’ vehicle navigation system to nearby Watertown, police converged on the terrorists. Very early on Friday morning, a gun battle ensued in a densely populated but usually quiet neighbourhood in suburban Watertown. More than 200 rounds were fired, and explosive devices were hurled at police. The older terrorist, wounded, charged police and was knocked to the ground. The younger, also wounded, tried to run down the officers in the hijacked auto; but instead ran over the older one, who subsequently died. The fleeing terrorist abandoned his car several blocks away and escaped on foot.

The terrorists had been identified as brothers, Tamerlan and Dzhokhar Tsarnaev, 26 and 19 years old, respectively, immigrants of Chechen heritage who had come to the US from Dagestan in Russia about a decade earlier.

Hundreds of officers began to assemble, while those at the scene sought to staunch the bleeding of...
utility of some of the investment made in equipment, training and technology to equip law enforcement with advanced capabilities. Much of the federal funding for drills, exercises, and law enforcement training in the last decade has required that exercises be regional and multi-agency, so the process of collaboration has been practised regularly. Starting only hours after the blast, the public was kept informed through joint press briefings by a collection of public officials. These were led by the Massachusetts Governor and Boston Mayor, and typically included the Boston Police Commissioner, the Massachusetts State Police Superintendent, the FBI's Boston Office Special-Agent-in-Charge, the US Attorney for Massachusetts, and the ATF Boston Field Division Special-Agent-in-Charge. As events evolved, other officials, when relevant, participated.

The collaborative presentations by these briefings could not assuage all fears or provide all desired answers; but they were, nonetheless, a generally calming and grounding influence, helping the community develop a broader, consistent, more accurate view of events. One exception was a period of intensified anxiety on Wednesday as an expected press conference was delayed many times, heightening apprehensions. But for the most part, the careful orchestration of the joint and collaborative presentation of factual information provided a salutary role throughout the week. Some 12 to 15 years ago, Boston would not have handled the Marathon bombings as effectively as it did in April. EMS and hospital-based emergency departments would have been challenged by the number of wounded victims arriving simultaneously. Similarly, law enforcement co-operation would not have been possible to the degree evidenced, and the broad-based political leadership co-operation evident in the press briefings might well have been impossible. Today, internal institutional preparedness and ability to integrate effort with other agencies is far superior.

Notably, as events broke swiftly, collaboration frequently formed bottom-up rather than by direction from above. Self-organised teams, often improvising their response, provided on-scene medical attention, facilitated hospital trauma care, and led to the ultimate apprehension of the surviving terrorist.

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